J. S. BLAKE.

CAR STEP.

APPLICATION FILED JUNE 12, 1911

1,020,254.

Patented Mar. 12, 1912.

2 SHEETS—SHEET 1.

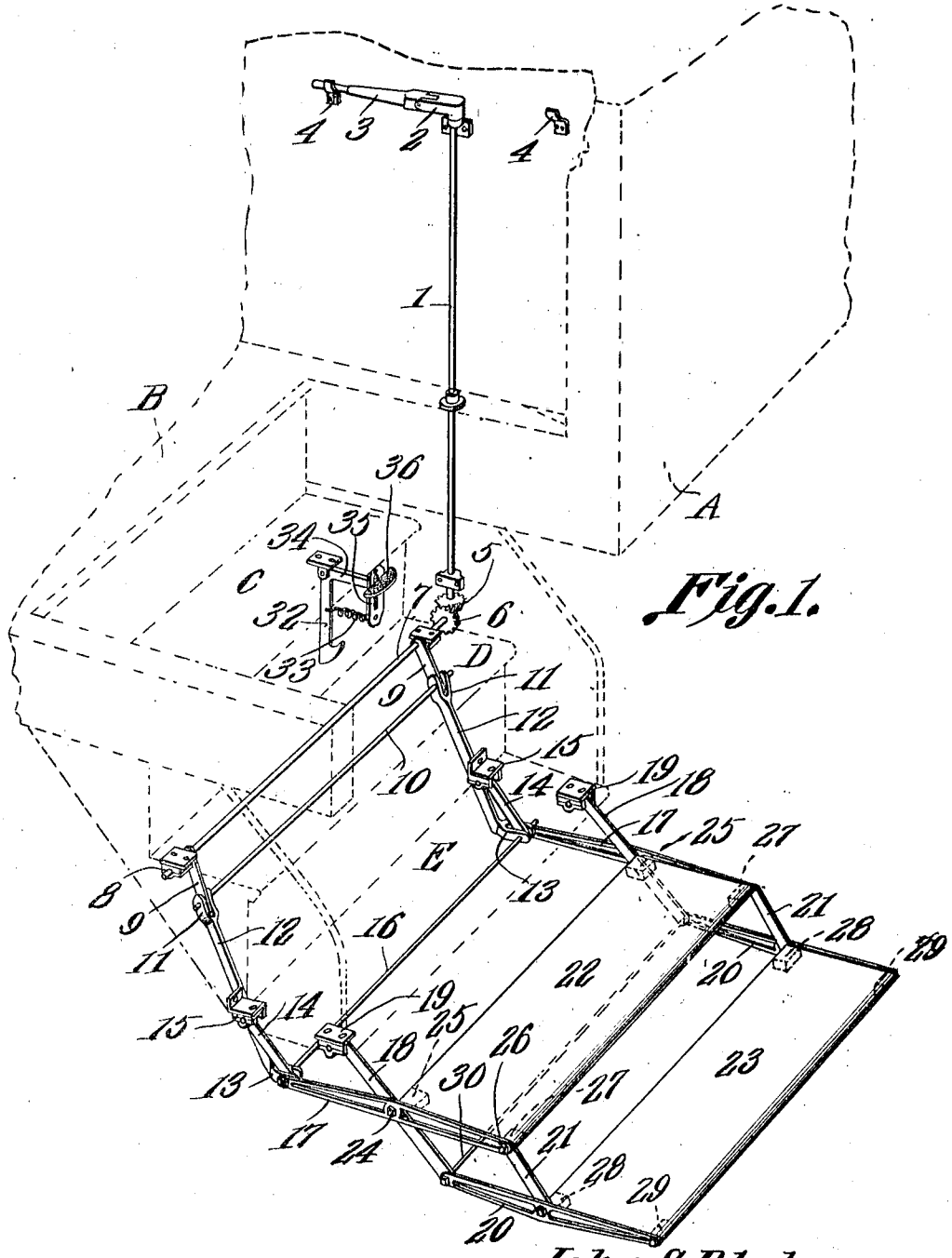

Fig. 1.

Witnesses

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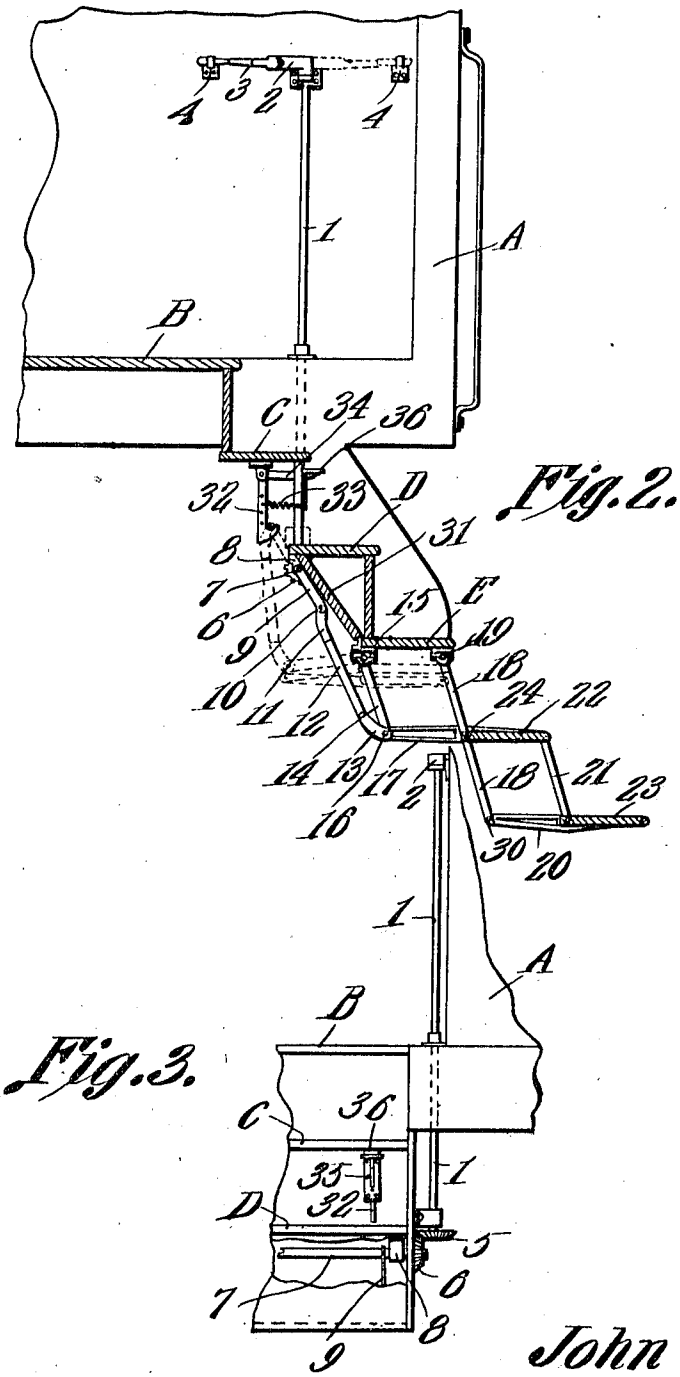

Fig. 2.

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN S. BLAKE, OF CHARLOTTE, NORTH CAROLINA.

CAR-STEP.

1,020,254. Specification of Letters Patent. Patented Mar. 12, 1912.

Application filed June 12, 1911. Serial No. 632,698.

To all whom it may concern:

Be it known that I, JOHN S. BLAKE, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented a new and useful Car-Step, of which the following is a specification.

This invention relates to folding car steps and is more particularly an improvement upon the structure disclosed in an application filed by me on March 13, 1911, Serial No. 614,094.

One of the objects of the present invention is to provide means whereby the steps, when folded, will be automatically locked.

Heretofore the foldable steps have been elevated by means of an operating element located adjacent the platform and in convenient reach of persons thereon and the same element has been employed for the purpose of lowering the steps. This has been found objectionable, however, because of the danger of unauthorized persons operating the element so as to lower the steps while the car is in motion.

It is the object of the present invention to provide means whereby the steps, when raised or folded, will be automatically locked so that it becomes impossible to lower the steps by manipulating said element.

Another object is to provide improved means whereby the steps, when lowered, will be locked against accidental folding.

A further object is to simplify and otherwise improve upon the construction of devices of this character.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a perspective view of the structure constituting the present invention. Fig. 2 is a vertical section through the extended steps, the positions of the parts, when the steps are folded, being indicated by dotted lines. Fig. 3 is a front elevation of a portion of the structure.

Referring to the figures by characters of reference A designates a car structure having a platform B and the usual fixed steps C, D and E leading to the platform.

A shaft 1 extends downwardly through the platform adjacent one side of the steps and is provided, at its upper end, with a head 2 to which a handle 3 is pivotally connected, there being brackets 4 or the like for the reception of the handle when swung to either limit of its movement during the rotation of the shaft 1. The lower end of the shaft 1 is supported below the intermediate step D and has a gear 5 secured to it, said gear meshing with another gear 6 secured to one end of a shaft 7. Said shaft is journaled within bearings 8 secured to the lower surface of the tread of step D and said shaft extends from one end to the other of the step and is provided, near its ends, with radial arms 9. Said arms are connected by a rod 10 which is parallel with the shaft 7 and constitutes the pivot of the forked upper ends 11 of links 12. The lower ends of these links are also forked, as shown at 13 and embrace the lower ends of hangers 14 which are suspended from bearing blocks 15 attached to the tread of the lower step E. A rod 16 extends transversely through the forked portions 13 and through the lower ends of the hangers 14 and constitutes the pivotal connection between the hangers and the links. Said rod also constitutes means for pivotally connecting the links 12 and hangers 14 to levers 17. The middle portions of the levers are supported by and pivotally connected to hangers 18 the upper ends of which are hung from bearing blocks 19 connected to the front corner portions of the tread of step E, these hangers extending downwardly below the levers 17 and being pivotally connected, at their lower ends, to levers 20. Levers 17 and 20 are parallel and the middle portions of the levers 20 are supported from the outer end portions of the levers 17 by hangers 21 pivotally connected to them. The movably supported steps are carried by the levers 17 and 20, the upper step 22 being interposed between the levers 17 while the lower step 23 is interposed between the levers 20. The pivot studs 24 connecting hangers 18 to the levers 17 project from blocks 25 secured within the rear corner portions of the step 22 while the studs 26 connecting the outer ends of levers 17 to the hangers 21 project from blocks 27 secured in the front corner

portions of the step 22. Blocks 28 and 29 are secured within the rear and front corners respectively of the step 23 and have studs projecting from them and engaging the levers 20, the studs extending from the blocks 28 constituting the pivot connections between the hangers 21 and the levers 20. Hangers 18 are connected to levers 20 by a pivot rod 30 extending under the step 22.

It will be understood that when shaft 1 is rotated in one direction by means of handle 3, motion is transmitted therefrom through the gears 5 and 6 to shaft 7 and that arms 9 are thus rotated with the shaft and swing downwardly, thus causing the links 12 to push against rod 16 and cause the hangers 14, 18 and 21 to swing downwardly so as to move the steps 22 and 23 away from the step E and to the position shown in Figs. 1 and 2. This movement of the parts is limited by the arms 9 coming into contact with a stop board 31 arranged obliquely within the angle formed by the riser and the tread of the step D. When the arms 9 are so positioned against this stop board, the rod 10 has moved past the dead center and it will be apparent, therefore, that should the steps 22 or 23 be subjected to an inward and upward pressure, they would not yield but would remain extended, arms 9 and stop 31 obviously coöperating to lock the steps in their extended positions.

By reversing the movement of the shaft 1 the arms 9 can be caused to pull upwardly on the links 12 and thus swing the hangers 14, 18 and 21 upwardly so as to fold the steps 22 and 23 together and close to the lower face of the step E. During the completion of this folding movement the rod 10 is brought into engagement with a hooked catch 32 pivotally suspended from the lower face of the step C and held yieldingly in a predetermined position by a spring 33. An arm 34 extends from the upper portion of the catch 32 and through a slot 35 formed in the riser of the step C, said arm being provided, at its outer end, with a foot plate 36 whereby it can be conveniently depressed or swung downwardly so as to swing the catch 32 inwardly against the stress of spring 33. As before stated, when the steps are folded, the rod 10 moves into engagement with the catch 32 and is thus held supported thereby so that there is no danger of the steps dropping to their lower or extended positions. By thus securing the steps, while folded, the shaft 1 is also locked against rotation and it therefore becomes impossible for any person to lower the steps without depressing the foot plate 36 so as to disengage catch 32 from the rod 10. Shaft 1 can then be rotated by means of handle 3 and the steps will move downwardly. It will be seen that the foot plate 36 is arranged below the level of the platform B so that when the vestibule of the car is closed, said plate cannot be reached.

It will be noted that the foldable steps and the parts for operating the same, can be readily applied to ordinary car structures without necessitating any changes in the construction thereof.

It will be apparent that the hangers 14, 18 and 21, together with the levers 19 and 20 constitute lazy tongs and form rigid connections between the steps 22 and 23 and the fixed steps of the car.

What is claimed is:—

1. The combination with a car platform and steps leading therefrom, of lazy tongs depending from the lower one of said steps, extension steps carried by the lazy tongs, an actuating element extending above the platform, means operated thereby for shifting the lazy tongs to move the extension steps toward or away from the fixed steps, means for automatically locking the extension steps when raised, and means located below the platform, for operating said locking means to release the steps.

2. The combination with a car platform and steps fixedly connected thereto, of lazy tongs depending from the lower one of said steps, extension steps carried by the lazy tongs, an actuating shaft extending above the platform, means operated thereby for shifting the lazy tongs to move the extension steps toward or away from the fixed steps, means for automatically locking the extension steps when raised, and means located below the platform, for operating said locking means to release the steps.

3. The combination with a car platform and steps fixedly connected thereto, of lazy tongs depending from the lower one of said steps, extension steps carried by the lazy tongs, arms mounted for rotation below one of the fixed steps, means extending above the platform for rotating said arms, a connection between the arms and the lazy tongs, means carried by one of the fixed steps for limiting the movement of the arms when shifted past the dead center to lock the tongs and extension steps in lowered positions, means for automatically locking the tongs and extension steps against movement when raised, and means located below the level of the platform for shifting said locking means to release the tongs and extension steps.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN S. BLAKE.

Witnesses:

JNO. C. BLAKE,

ABRAM A. BOLLINGER.